

Black Opal

Multi Function Flat Panel Display System

with ***MultiVision***

from ***Laserdyn***
Technologies 

Models RMU

User's Manual



User's Manual

**READ THIS DOCUMENT THOROUGHLY BEFORE
ATTEMPTING TO ASSEMBLE OR OPERATE
THE**

Black Opal **Multi Function Flat Panel Display Systems** **Models RMU**

Treatment of this product other than as specified herein may result in:
damage to the product or attached systems;
invalidation of the warranty.

The location of this document should always be known to all users of, and technical support personnel for, the Black Opal RMU.

*The information contained herein is proprietary to Laserdyne Pty Ltd. No part of this work may be reproduced or copied in any way without prior written permission of Laserdyne Pty Ltd.
Note: specifications herein are subject to change without notice.*

CAUTIONS:

- **On receipt of your Black Opal RMU, immediately report any damage to packaging or contents to your supplier.**
- **Ensure that all instructions in the separate Specifications and Set-up document applicable to your model are performed correctly, before attempting to operate the Black Opal RMU.**
- **The system is in standby status whenever external power is applied. Do not leave the system in standby status for extended periods (remove external power).**
- **Resetting the system should not be performed gratuitously, as the system may not have updated its EEPROM settings since the last setting change.**
- **Avoid scratching, abrading or contaminating the surface of the display window; do not scrub.**



Tracking Records	
<i>This document is appropriate for the following product configurations:</i>	
Model:	Black Opal Models: RMU6H; RMU8H; RMU8HS; RMU10H; RMU10HX; RMU12H; RMU15H; RMU19H.
Initial Installed Software Version:	4.5



TABLE OF CONTENTS

Chapter	Page
1 INTRODUCTION	1-1
1.1 Scope	1-1
1.2 Document Structure	1-1
2 SAFETY	2-1
2.1 Electrical Safety	2-1
2.2 System Protection	2-1
3 PACKING, HANDLING, STORAGE & TRANSPORTATION	3-1
3.1 Packing, Unpacking and Inspection	3-1
3.2 Handling	3-1
3.4 Storage	3-1
3.3 Transportation	3-1
4 SYSTEM DESCRIPTION	4-1
4.1 General Purpose	4-1
4.2 General Description	4-1
4.2.1 General	4-1
4.2.2 Display	4-1
4.2.3 Auto Backlight Reduction	4-1
4.2.4 Upgrades	4-2
4.2.5 Additional Features	4-2
4.3 System Contents	4-2
5 SYSTEM SPECIFICATIONS & SET-UP	5-1
6 OPERATION	6-1
6.1 Controls	6-1
6.2 Indicators	6-2
6.3 Button Labelling, Adjustments & Menu Presentation	6-3
6.4 Operating Procedures	6-3
6.4.1 Start-up	6-4
6.4.1.1 Starting Up	6-4
6.4.1.2 The Boot-up Sequence	6-4
6.4.1.3 Bypassing the Boot-up Sequence	6-4
6.4.2 Primary Button Functions	6-5
6.4.3 Scroll/Adjust Button Functions	6-5
6.4.3.1 Swap Video Channels in a Lay-out	6-5
6.4.3.2 Adjust Image Enhancement	6-6
6.4.3.3 Adjust Digital Zoom	6-6
6.4.4 Reset	6-7
6.4.5 Menus	6-7
6.4.5.1 <i>Main</i> Menu	6-7



6.4.5.2 <i>Video</i> Menu	6-8
6.4.5.3 <i>VGA</i> Menu	6-10
6.4.5.4 <i>Defaults</i> Menu	6-12
6.4.6 Working with Menus - How to	6-12
6.4.6.1 For Video	6-13
6.4.6.1.1 Adjust Contrast, Brightness and/or Colour Saturation	6-13
6.4.6.1.2 Select Colour Option for Display	6-13
6.4.6.2 For VGA	6-13
6.4.6.2.1 Correct Native VGA Image for Contrast, Brightness and/or Phase	6-14
6.4.6.2.2 Correct Native VGA Image for Position and/or Frequency	6-14
6.4.6.3 Restore Set-up Defaults	6-14
6.4.6.4 Reboot the System	6-14
6.4.6.5 Set the System to Standby	6-14
6.4.7 Shut-Down	6-15
6.5 Special Functions & Modes	
7 GENERAL MAINTENANCE	7-1
7.1 General Cleaning and Care	7-1
7.2 Replacing Desiccant	7-1
APPENDICES	
A Faultfinding Guide	A-1
B Set-up Menus	B-1
C Comms Support	C-1
LIST OF FIGURES	
Figure 6-1: Controls and Indicators (smaller models)	6-1
Figure 6-2: Controls and Indicators (larger models)	6-2
Figure 6-3: <i>Main</i> Menu Structure (VGA with video PIP)	6-8
Figure 6-4: <i>Video</i> Menu Structure	6-9
Figure 6-5: <i>VGA</i> Menu Structure	6-10
Figure 6-6: <i>Defaults</i> Menu Structure	6-12



1 INTRODUCTION

1.1 Scope

This User's Manual is designed for the operator of the Black Opal models RMU. It contains set-up, operating, and user-level faultfinding and maintenance information.

1.2 Document Structure

This manual is structured to take the reader through safety observations, system description and specifications to the set-up, operation and general maintenance of the Black Opal RMU.

There is no separate maintenance document for the Black Opal RMU - relevant maintenance information is contained in this User's Manual.

Some diagrams may be made available to the original purchaser of the Black Opal RMU, depending upon the level of maintenance undertaken by the user.



2 SAFETY

2.1 Electrical Safety

The Black Opal RMU is designed to operate from low voltage dc power.

Once installed, there are no safety procedures required to protect the operator from the RMU itself.

NOTE: **the On/Off button switches the unit from standby to operating status, it does not cut the unit off entirely from the external power input.**

2.2 System Protection

The system is internally protected against:

- reverse polarity;
- over-voltage;
- over-current.



3 PACKING, HANDLING, STORAGE AND TRANSPORTATION

CAUTION: on receipt of your Black Opal RMU, immediately report any damage to packaging or contents to your supplier.

3.1 Packing, Unpacking and Inspection

To unpack on first receipt:

1. carefully open the outer packaging, do not slit cartons deeper than sealing tape;
2. remove the Black Opal RMU components and any Manuals and ancillary items from the carton;
3. remove the RMU from its plastic bag/wrap;
4. remove the protective sheet from the front of the RMU;
5. retain packing materials if required for future use.

Packing is in the reverse order.

3.2 Handling

Touching or abrading any exposed optical surface is to be avoided.

Environmental conditions specified in this manual should not be exceeded.

3.3 Storage

The equipment may be stored in its original packaging provided that packing and handling conditions described in this manual are observed. The packaged unit should not be stored in damp conditions or damage to the packaging will result.

The unpackaged unit should not be stored in areas where conditions may exceed the product's environmental specification.

3.4 Transportation

All items should be packed as described in this manual. Road, rail or air transport are suitable transport methods.



4 SYSTEM DESCRIPTION

4.1 General Purpose

The Black Opal models RMU have been engineered for a wide range of land-, sea- or air-borne display applications including remote/indirect viewing of video images generated by day, night or thermal cameras.

4.2 General Description

4.2.1 General

Each Black Opal model RMU12H consists of a LCD, a microprocessor unit (computer) and power & control electronics.

Each unit features *MultiVision*, providing simultaneous display of two video inputs and one PC input at full frame rates.

All items are housed within a rugged enclosure containing heating and cooling mechanisms. The LCD is protected by a tough, antireflection-coated window which also provides EMI/EMC shielding. All models are button operated.

4.2.2 Display

Images are displayed on a backlit LCD that may be viewed in full direct sunlight down to full darkness and feature backlight settings suitable for low light viewing, for viewing with Night Vision Devices and completely off for black-out conditions.

4.2.3 Auto Backlight Reduction

To reduce power consumption, and as part of the Black Opal RMU thermal management scheme, the backlight will automatically reduce to 300 nits if:

- the current backlight setting is greater than 300 nits; and
- no button has been pressed for more than 120 seconds and the internal temperature is above a preset limit.

Pressing any of buttons 1 to 5 will cause the system to return to the current backlight setting.



4.2.4 Upgrades

The Black Opal RMU has been designed so that software upgrades can be downloaded easily via a PC.

4.2.5 Additional Features

NOTE: Image Enhancement and Digital Zoom are available whenever the main window in a Screen Lay-out is video, not PC input.

The Black Opal RMU has several features designed to increase the effectiveness of surveillance, sighting and security systems.

Image Enhancement: video inputs are compensated for obscuration (e.g. rain, fog, snow, mist or smoke) within an adjustable central window where contrast and colour are enhanced. For a chosen window size, the enhancement is applied to that portion of the displayed image.

Digital Zoom: a fully X & Y interpolated "smart" zoom, not merely pixel multiplying, yields a clear zoomed image without the blocky "pixelated" appearance often seen with digital zooming.

Freeze Frame: freezes the current prime video channel while leaving live any video inset.

4.3 System Contents

The Black Opal RMU system consists of:

- 1 x Black Opal RMU unit;
- 1 x User's Manual;
- 1 x Specification and Set-up document; and
- 1 x Variant Specification document (if applicable).

plus any options that the purchaser has elected to acquire.

NOTE: the purchaser must supply the appropriate Power, Video and VGA Cable Assemblies.



5 SYSTEM SPECIFICATIONS & SET-UP

The specifications and set-up procedures for your model of Black Opal RMU are presented in a separate Specifications & Set-up document provided with your unit.

CAUTION: ensure that all instructions in the separate Specifications and Set-up document applicable to your model are performed correctly, before attempting to operate the Black Opal RMU.

6 OPERATION

6.1 Controls

The RMU has eight points of control, being either:

a vertical array of tactile buttons located on the left front face of the unit - these are momentary (one result per press) buttons behind a sealed rubber membrane (smaller models); or

a horizontal array of buttons located on the bottom of the front face of the unit - these are momentary (one result per press) individually sealed buttons (larger models).

In either case, the button functions, their labels and their associated menus are the same.

The functions of the five Function Buttons vary depending upon the screen being displayed and the level of customisation in the system software. In every case, the available button function is displayed beside the button on the LCD.

The Scroll/Adjust buttons are available whenever a setting can be varied over a range. Such settings include backlight intensity, display settings and digital zoom settings.

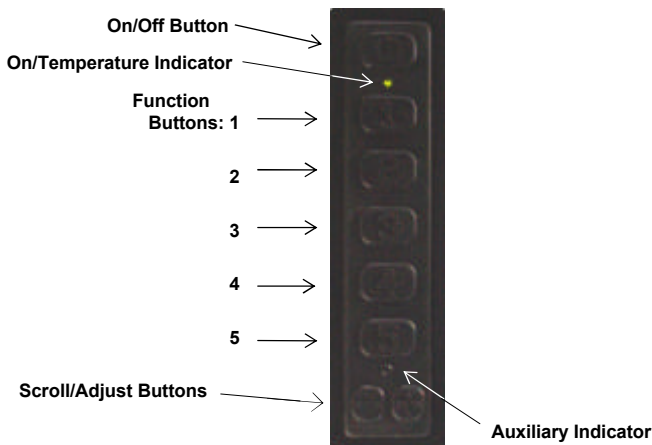


Figure 6-1: Controls and Indicators (smaller models)

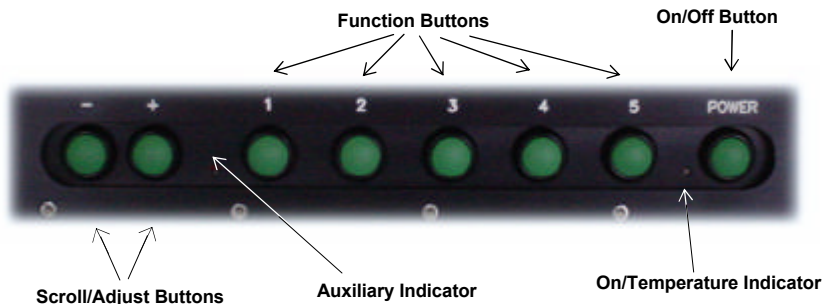


Figure 6-2: Controls and Indicators (larger models)

6.2 Indicators

There are two indicators (other than screen messages) on the unit:

the On/Temperature indicator - a bicolour LED to indicate (green) when the unit is on and (red) when either in warm-up mode or in an over-temperature condition, located between the On/Off button and button 5; and

the Auxiliary indicator - a red LED as an indicator for an external optional, customer specified auxiliary input, located between the "+" "-" buttons and button 1.

If the RMU internal temperature is too low, Warm-up Mode will be engaged, and the On/Temperature indicator will:

in the case of models with a vertical array of buttons under a rubber membrane - be on continuously red;

in the case of models with a horizontal array of individual buttons - blink red at 1Hz.

Once the internal temperature is within operating parameters this indicator will glow green and the unit will fully power up.

If the RMU internal temperature is too high, it will shut down and the On/Temperature indicator will:

in the case of models with buttons under a vertical rubber membrane – go off;

in the case of models with a horizontal array of individual buttons - blink red at 2Hz.



Once the internal temperature is within operating parameters this indicator will glow green and the unit will fully power up.

6.3 Button Labelling, Adjustments & Menu Presentation

- If no button has been activated for about three seconds, and no menus have been entered, the button labels will be withdrawn from the screen, however scroll/adjust buttons will still be active for the current adjustable parameter. Pressing any Function Button (buttons 1 to 5) will restore the labels without initiating a new function.
- In any menu, button 2 becomes EXIT, button 5 becomes ENTER and buttons 1, 3 & 4 are disabled.
- In any menu, the BACK item will return to the previous menu.
- Select menu items using the scroll/adjust buttons. Press ENTER to enable the selection. Press EXIT to abandon the menu and any unfinished adjustments.
- The scroll/adjust buttons will be labelled as “-PARAMETER+” to indicate which parameter is selected for adjustment.
- Backlight can be adjusted at any time by using the scroll/adjust buttons, unless ZOOM or MENU has been selected.
- Zoom can be adjusted at any time by using the scroll/adjust buttons, unless BACKLT or MENU has been selected.
- Various display settings can be adjusted, once they have been selected through the menu structure, by using the scroll/adjust buttons.
- Once ENTER has been pressed the previous menu will be presented if no concurrent options are available, else the current menu will be maintained if more than one item in it can be enabled or adjusted concurrently.
- Whenever button labels are displayed, the name of the current screen lay-out is also displayed above the top-most button label.

6.4 Operating Procedures

CAUTION: the system is in standby status whenever external power is applied. Do not leave the system in standby status for extended periods (remove external power).



6.4.1 Start-up

6.4.1.1 Starting Up

- Before proceeding check that all connections and mountings are secure and appropriate, then switch on external power to the RMU.
- Press the On/Off button to power up the system.

NOTE: **the display will appear dark for the first few seconds, especially in bright ambient conditions.**

6.4.1.2 The Boot-up Sequence

The boot-up sequence has three distinct phases, all of which can be customized to suit customer requirements.

The first phase is the initial backlight setting. The default for this phase is a slow ramp up of backlight intensity, accompanied by the message "Press any key when backlight OK". Press and hold any of buttons 1 to 5 to stop the backlight from increasing further, and release the button when the message "OK" is shown. If no buttons are pressed during this phase, the backlight will increase to its maximum level.

The second phase is the presentation of the boot-up logo.

The third phase is the presentation of hardware and software version information.

6.4.1.3 Bypassing the Boot-up Sequence

The entire boot-up sequence can be bypassed by pressing any of buttons 2 to 5 on power-up and holding it until the backlight shows. The number of the button pressed determines the backlight level, with button 5 being maximum, button 4 being less intense, button 3 being low intensity, and button 2 being the NVG compatible mode.

Performing this action not only sets the initial backlight level without ramping up, it also skips the logo and version presentations.

Customised boot-up sequences (such as always booting up to a fixed backlight level, or disabling boot-up sequence phases) may be introduced by the user (see Section 6.5).

NOTE: **this method of setting a backlight level applies only to the boot-up sequence, the normal method of adjusting backlight level is using the + and – buttons.**



6.4.2 Primary Button Functions

After boot-up:

- Press MENU (button 1) to access menu functions; or
- Press LAYOUT (button 2) to show the predefined screen lay-outs, then press the appropriate button to select the desired lay-out (see appendices for instructions on how to create screen a lay-out under the Set-up menu structure and for descriptions of lay-outs); or
- Press ENH (button 3) to enable image enhancement and allow enhancement-window adjustment (only available for video) (will be replaced by NO ENH).; or
- Press ZOOM (button 4) to allow digital zoom adjustment (will be replaced by BACKLT) (only available for video); or
- Press FREEZE (button 5) to freeze image (will be replaced by UNFREEZE).

NOTE: **you can:**
 freeze a zoomed, enhanced or zoomed-&-enhanced image;
 enhance a frozen image; or zoom a frozen, enhanced, frozen
 & enhanced image.

NOTE: **Image Enhancement and Digital Zoom are available whenever**
 the main window in a Screen Lay-out is video, not PC input.

6.4.3 Scroll/Adjust Button Functions

The following sections describe the use of the scroll/adjust buttons to adjust the (non-menu) parameter associated with a primary button function.

6.4.3.1 Swap Video Channels in a Lay-out

NOTE: **this option is only available if the total number of screen lay-**
 outs is less then five, otherwise the 6th and 7th lay-outs are
 assigned to the + and – buttons respectively.

When in the Lay-out screen, pressing the scroll/adjust buttons will cause the main window and the Picture-in-Picture (PIP) to swap within the current Lay-out.

- Press LAYOUT to enable Lay-out screen.
- Use scroll/adjust buttons (now labelled –SWAP+) to initiate swap, according to the following rules.



If video channel 1 or 2 is shown in the main window, then the swap between main window and PIP is from channel 1 to 2.

If video channel 3 or 4 is shown in the main window, then the swap sequence is (e.g. if starting with channel 3 main, channel 4 PIP):

channel 4 main, channel 4 PIP;
channel 1 main, channel 2 PIP;
channel 2 main, channel 1 PIP;
channel 3 main, channel 4 PIP;
repeat sequence;

counting up for main window with the + button, and down for main window with the – button.

NOTE: the video channel that is output from the display unit is always that shown in the current main window.

NOTE: settings (e.g. contrast, brightness, colour saturation, etc.) remain as set for the current lay-out, i.e. they do not change with the swap of video channels.

NOTE: this feature will not function correctly if the connection format is different for multiple video channels, or if the video standard is not the same.

6.4.3.2 Adjust Image Enhancement

- Press ENH to enable image enhancement.
- Use scroll/adjust buttons (now labelled -ENH+) to select desired enhancement-window size (will default to that last selected).

NOTE: window size has an effect on enhancement as only the portion of the image contained in the window is sampled. A smaller window can yield a more profound result if it contains a narrower spread of native contrasts than a larger one.

NOTE: If zoom is selected on an enhanced image, the enhancement parameters are held constant.

6.4.3.3 Adjust Digital Zoom

The unit offers sixteen digital zoom positions, covering 0.7X to 10X for PAL inputs, and 1X to 16X for NTSC inputs. When the unit is turned on the zoom defaults to the lowest available setting.



- Press ZOOM to enable the scroll/adjust buttons for digital zoom adjustment.
- Use scroll/adjust buttons (now labelled -ZOOM+) to select desired zoom setting.

6.4.4 Reset

The system may be reset by pressing buttons 1, 2 and 5 simultaneously (akin to the CTRL-ALT-DEL pattern for PC systems).

CAUTION: **resetting the system should not be performed gratuitously, as the system may not have updated its EEPROM settings since the last setting change.**

6.4.5 Menus

There are two menu structures: the User's menu structure and the Set-up menu structure.

The Set-up menu structure is not used in normal operation. It is only available when a special button combination is activated. It allows basic and advanced set-up of inputs, outputs, corrections and adjustments. The settings selected in the Set-up menu structure become the default settings for parameters in the User's menu structure. The Set-up menu structure is described in an appendix to this User's Manual.

The User's menu structure is available during normal viewing and use. It allows the operator to perform basic corrections and adjustments effecting the appearance of the display. Settings made under the User's menu structure are retained until the next change, even during shut-down and start-up. The user can, at any time, return all parameters to the default settings selected under the Set-up menu structure.

6.4.5.1 Main Menu

Whether a *Main* menu is offered will depend on whether the current screen lay-out contains Picture-in-Picture (PIP). It is only offered when PIP is present. It will also differ slightly depending on whether the main screen is video or VGA.

The *Main* menus are shown in the following diagrams

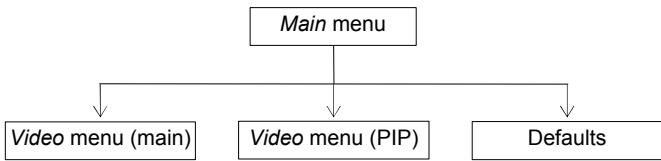


Figure 6-3: *Main Menu Structure (video with video PIP)*

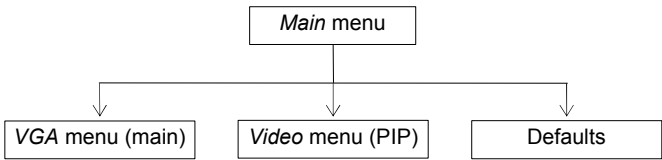


Figure 6-4: *Main Menu Structure (VGA with video PIP)*

- Pressing MENU, when in a screen lay-out that has PIP, accesses the appropriate *Main* menu.

#	Menu Item	Result
1	Video Main	Accesses <i>Video</i> menu to allow adjustment of display characteristics for video channel 1 for full screen in the current lay-out.
2	VGA Main	Accesses <i>VGA</i> menu to allow adjustment of display characteristics for VGA channel in current lay-out.
3	Video PIP	Accesses <i>Video</i> menu to allow adjustment of display characteristics for video channel 2 as Picture-in-Picture in current lay-out.
4	Defaults	Restores settings to those made and saved under the Set-up menu structure, for nominated screen lay-out(s).

- Select the desired item and press ENTER.

6.4.5.2 *Video Menu*

The *Video* Menu is accessed via a *Main* menu when the current screen lay-out contains a PIP, or by pressing MENU when the current screen lay-out is only full-screen video.

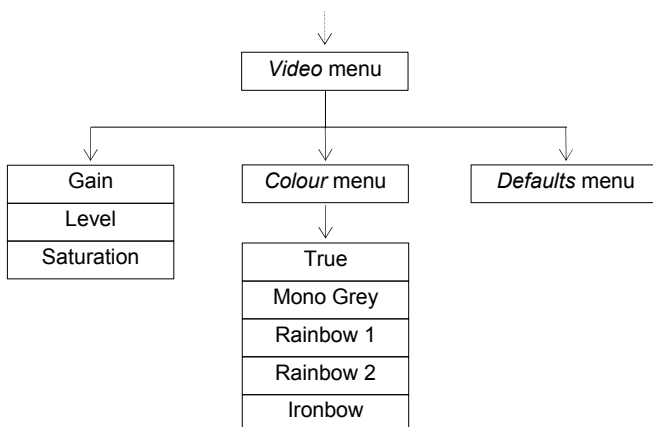


Figure 6-5: *Video Menu Structure*

- Selecting the *Video* menu presents the menu items GAIN, LEVEL, SATURATION, COLOUR and, if the *Video* menu was accessed from a full screen video lay-out with no PIP (i.e. accessed via the MENU button), DEFAULTS.

#	Menu Item	Result
1	<i>Gain</i>	Allows the adjustment of gain value for display contrast.
2	<i>Level</i>	Allows the adjustment of offset value for display brightness (as opposed to backlight intensity).
3	<i>Saturation</i>	Allows the adjustment of colour intensity (similar to the “colour” feature on a TV).
4	<i>Colour</i>	Accesses <i>Colour</i> menu to allow selection of colour options (e.g. true colour, mono or pseudo colour).
5	<i>Defaults</i>	Accesses <i>Defaults</i> menu for restoration of Set-up defaults to screen-layout(s), and allows the system to be rebooted or set to standby.

- Select the desired item and press ENTER.
- In the case of GAIN, LEVEL or SATURATION, adjust value and press ENTER.



- Selecting COLOUR presents the menu items: TRUE for true colour input, MONO GREY for monochrome input (or colour input), RAINBOW 1 for pseudo colourisation based on spectral rainbow version 1, RAINBOW 2 for pseudo colourisation based on spectral rainbow version 2, and IRONBOW for pseudo colourisation based on the colour temperature spectrum of iron. Select the desired item and press ENTER. RAINBOW 1, RAINBOW 2 and IRONBOW will access the *Pseudo* menu. The *Pseudo* menu offers TRUE for unmodified pseudo colourisation, INVERT for inverted pseudo colourisation, THRESHOLD to enable a “temperature” (grey scale) threshold above which pseudo colourisation is applied, and ADJUST for setting the threshold to be enabled by THRESHOLD. Select the desired item and press ENTER.

NOTE: **pseudo colourisation can be applied in a screen lay-outs where video any video is displayed, and will be applied to all video windows in the lay-out.**

NOTE: **all pseudo colourisation is effected by the use of OVERDRIVE (“whiter-than-white”), which will skew the temperature/colour correlations.**

NOTE: **the MONO GREY option is used to generate 256 grey scales for both colour and monochrome**

- If defaults are offered and desired, select DEFAULTS and press ENTER.

6.4.5.3 VGA Menu

The VGA Menu is accessed via a *Main* menu when the current screen lay-out has VGA with a PIP, or by pressing MENU when the current screen lay-out is only full-screen VGA.

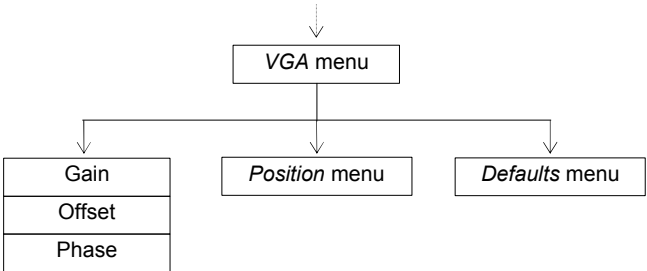


Figure 6-6: VGA Menu Structure



NOTE: to set up VGA input, go first to the **FREQUENCY** option in the **Position** menu (via the **VGA** menu, i.e. **Main/VGA/Position/FREQUENCY**). Set this value first before any other parameter within the **VGA** menu structure.

- Selecting the **VGA** menu presents the menu items **GAIN**, **OFFSET**, **PHASE** and **POSITION**, and if the **VGA** menu was accessed from a full screen **VGA** lay-out with no **PIP** (i.e. accessed via the **MENU** button), **DEFAULTS**.

#	Menu Item	Result
1	<i>Gain</i>	Allows the adjustment of gain value for display contrast.
2	<i>Offset</i>	Allows the adjustment of offset value for display brightness (as opposed to backlight intensity).
3	<i>Phase</i>	Allows the adjustment and setting of phase value.
4	<i>Position</i>	Accesses <i>Position</i> menu to allow adjustment of horizontal and vertical on-screen position.
5	<i>Defaults</i>	Accesses <i>Defaults</i> menu for restoration of Set-up defaults to screen-layout(s), and allows the system to be rebooted or set to standby.

- Select the desired item and press **ENTER**.
- In the case of **GAIN**, **OFFSET** or **PHASE**, adjust value and press **ENTER**.

NOTE: the **VGA GAIN** and **OFFSET** adjustments work differently to those for video. The two are inter-related, and change inversely to the value change (i.e. increased value yields decreased effect).

- Selecting **POSITION** presents the menu items **HORIZ**, **VERT** and **FREQUENCY**. Select the desired item, adjust value and press **ENTER**.

NOTE: ensure that **FREQUENCY** is set before any other parameter in the **VGA** menu structure;
 some positions on the screen may result in an unstable image - if this occurs, adjust the position slightly until the instability ceases.

- If defaults are offered and desired, select **DEFAULTS** and press **ENTER**.



6.4.5.4 Defaults Menu

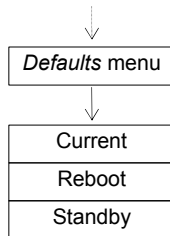


Figure 6-7: Defaults Menu Structure

- Selecting the *Defaults* menu presents the menu items CURRENT, REBOOT, and STANDBY.

#	Menu Item	Result
1	Current	Restores Set-up values to the User parameters for the current screen lay-out.
2	Reboot	Reboots the system.
3	Standby	Sets the system to standby.

- Select the desired item and press ENTER.

6.4.6 Working with Menus - How to

In every case:

selection of a menu item is achieved by scrolling to it with the scroll/adjust (-/+) buttons and then pressing ENTER (button 5); and
setting a value is achieved by adjusting it to the desired value using the scroll/adjust (-/+) buttons and then pressing ENTER (button 5).

Once a selection has been made or a value has been set:

if no other items in the current menu are still relevant, the system will return to the next highest relevant menu; or
if other items in the current menu are still relevant, the system will remain in the current menu.

You can progress back up the menu structure by selecting BACK, or close the menu presentation entirely by pressing EXIT (button 2).

NOTE: pressing EXIT will abandon any in-progress adjustments (i.e. adjustments that have not yet been set by pressing ENTER).



6.4.6.1 For Video

- If a *Main* menu is offered, select VIDEO MAIN or VIDEO PIP (in the case of full-screen video only, the *Video* menu will be offered directly upon pressing MENU button).

6.4.6.1.1 Adjust Contrast, Brightness and/or Colour Saturation

- From the *Video* menu, select GAIN (to adjust display contrast), LEVEL (to adjust display brightness, as opposed to backlight intensity), or SATURATION (to adjust colour intensity), as required.
- Set value(s) as required.

6.4.6.1.2 Select Colour Options for Display

- From the *Video* menu, select COLOUR.
- From the *Colour* menu, select TRUE (to display the true input colour) or MONO GREY [to display 8-bit grey scale]; or
- From the *Colour* menu, select RAINBOW 1 for pseudo colourisation based on spectral rainbow version 1, RAINBOW 2 for pseudo colourisation based on spectral rainbow version 2, or IRONBOW for pseudo colourisation based on the colour temperature spectrum of iron. The *Pseudo* menu will be offered.
- If a pseudo colourisation item has been selected from the *Colour* menu (RAINBOW 1, RAINBOW 2 or IRONBOW) then from the *Pseudo* menu, select TRUE for unmodified pseudo colourisation, INVERT for inverted pseudo colourisation, THRESHOLD to enable a “temperature” (grey scale) threshold above which pseudo colourisation is applied, or ADJUST for setting the threshold to be enabled by THRESHOLD. Select the desired item and press ENTER.

6.4.6.2 For VGA

NOTE: ensure that **FREQUENCY** is set before any other parameter in the **VGA** menu structure.

- If a *Main* menu is offered, select VGA MAIN (in the case of full-screen VGA only, the *VGA* menu will be offered directly upon pressing MENU button).



6.4.6.2.1 Correct Native VGA Image for Contrast, Brightness and/or Phase

- From the *VGA* menu, select *GAIN* (to adjust display contrast), *OFFSET* (to adjust display brightness, as opposed to backlight intensity) or *PHASE* as required.
- Set value(s) as required.

6.4.6.2.2 Correct Native VGA Image for Position and/or Frequency

- From the *VGA* menu, select *POSITION*.
- Select *HORIZ*, *VERT* or *FREQUENCY* as required.
- Set value(s) as required.

6.4.6.3 Restore Set-up Defaults

- If a *Main* menu is offered, select *DEFAULTS* (in the case of full-screen *VGA* or *VIDEO* only, the *Defaults* menu is offered under the *Video* and *VGA* menus).
- From the *Defaults* menu, select *CURRENT*.

6.4.6.4 Reboot the System

NOTE: this function is the same as turning the system off and then on again using the On/Off button. It is used during software maintenance activities.

- From the *Defaults* menu, select *REBOOT*.

6.4.6.5 Set the System to Standby

NOTE: this function is the same as turning the system off using the On/Off button. It is used during software maintenance activities.

- From the *Defaults* menu, select *STANDBY*.



6.4.7 Shut-down

- Press the On/Off button for approx. 3 seconds to set the unit to standby.
- Switch off external power to the unit.

6.5 Special Functions & Modes

Special functions are available to the user, accessed during the boot-up sequence.

They are:

Boot Sequence Customisation, where the initial backlight level, and the presentation of the boot logo and of version data may be altered;

EEPROM Recovery, to be used in the case where lay-outs have become corrupted; and

“Demo” Mode, which runs a sequence of patterns and features for test purposes and for when an automatic demonstration of system features is desired.

To access these, the appropriate buttons must be pressed at appropriate times during the boot-up sequence, as set out in the following table.

PARAMETER		BUTTON:							WHEN	NOTES
		1	2	3	4	5	-	+		
Boot Sequence Customisation										
Default	Ramp-up							✓	press and hold from power on until red LED turns on, then release	there is only one opportunity to change settings on each power-up, so all of the desired changes need to be done in one operation to avoid having to start up again for each change; choose the desired settings before power up, and press & hold ALL applicable buttons simultaneously
Backlight	Bright		✓					✓		
Level:	Low	✓						✓		
	Custom (fixed)	✓	✓					✓		
Boot Logo Toggle On/Off				✓				✓		
Version Info. Toggle On/Off					✓			✓		
Log Info. Toggle On/Off						✓		✓		



PARAMETER	1	2	3	4	5	-	+	WHEN	NOTES
EEPROM Recovery									
Recover	✓	✓	✓	✓	✓			press and hold from power on until red LED blinks	the LED blinks while the EEPROM is recovered, power down after 2 minutes
"Demo" Mode									
Run-Once	A				B			press and hold button A during the version screen, release and	The "Demo" mode script that is enabled is the one last recorded
Run-Always Toggle On/Off	A				B	B		press button(s) B when "SETUP	
Record	A				B	B	B	MENUS:" is displayed, release after 1 second	



7 GENERAL MAINTENANCE

7.1 General Cleaning and Care

The following procedures are those that may be performed by the User.

Other than the following procedures maintenance is to be performed only by authorised service personnel.

CAUTION: **avoid scratching, abrading or contaminating the surface of the display window; do not scrub.**

- Clean display screens and control panels with a soft cloth and spirit.
- Clean housings with a soft cloth and spirit.
- Clean connectors and mounting points with a soft brush.

7.2 Changing Desiccant

Larger Black Opal RMU models are fitted with a desiccant capsule in the rear of the unit. The largest models carry two.

The desiccant should be checked and replaced in any of the following events:

on-screen advice to check desiccant is displayed on boot up;

internal fogging of the display window occurs; or

a six month period has elapsed since the last time desiccant was checked.

- Unscrew the outer exposed knurled ring(s) and extract the capsule(s). Remove the knurled cap(s) from the other end of the capsule(s).
- Check desiccant colour and replace if it is no longer blue.
- Recap the capsule(s) and screw back into the unit.



APPENDIX A: FAULTFINDING GUIDE

#	Symptom	Probable Cause(s)	Remedy
1	System will not turn on	a/ no power from remote source	a/ check power supply & specifications, harness & connections
2	Power supplied but no display	a/ temperature too low	a/ allow unit to warm up
3	No image	a/ connected video or graphics source not operating/sending b/ connector dirty or faulty	a/ check operation & specifications of connected signal source b/ check/clean/adjust connector
4	Controls do not respond	a/ selected at inappropriate point in menu structure b/ faulty buttons	a/ check operating instructions b/ service required, return for diagnosis/repair
5	Image lacks contrast, brightness and colour quality	a/ settings inappropriate	a/ adjust settings
6	Dark screen	a/ Backlight setting at minimum	a/ adjust Backlight setting
7	Screen lay-outs corrupt/imagery garbled¹	a/ PC input refresh rate is not 60Hz or PC resolution is non-standard b/ EEPROM holding lay-out configurations is corrupted	a/ adjust PC settings b/ after turn-on, press and hold all buttons 1 to 5 simultaneously for 10s; release and wait for unit to auto power down (approx. 30s); wait 5s then restart ²

¹ e.g. pixels out of place, lines convoluted, menus illegible.

² Factory defaults will be restored, so all lay-out changes will be lost.



APPENDIX B: SET-UP MENUS

TABLE OF CONTENTS

Chapter	Page
B1 INTRODUCTION	B-3
B2 OPERATION	B-4
B2.1 General	B-4
B2.1.1 Accessing Set-up Menus	B-4
B2.1.2 Menu Structure	B-4
B2.1.3 Recommended Method	B-5
B2.1.4 About Screen Lay-outs	B-6
B2.2 <i>Main</i> Menu	B-7
B2.3 <i>Video</i> Menu	B-7
B2.3.1 <i>Input</i> Menu	B-8
B2.3.2 <i>Correction</i> Menu	B-9
B2.3.3 <i>Adjust</i> Menu	B-10
B2.4 <i>VGA</i> Menu	B-11
B2.4.1 <i>Input</i> Menu	B-12
B2.4.2 <i>Adjust</i> Menu	B-12
B2.5 <i>Output</i> Menu	B-13
B2.5.1 <i>Lay-out</i> Menu	B-14
B2.5.2 <i>Motion</i> Menu	B-15
B2.6 <i>Defaults</i> Menu	B-15
B2.7 Working with Menus - How to	B-16
B2.7.1 For Video	B-16
B2.7.1.1 Set Composite or Svideo Connection Format	B-16
B2.7.1.2 Set PAL-B or NTSC-M Signal Format	B-16
B2.7.1.3 Set Other Signal Formats	B-17
B2.7.1.4 Set Normal or "Whiter-than-White" Overlay	B-17
B2.7.1.5 Correct Native Image for Position and/or Hue	B-17
B2.7.1.6 Alter PLD, System and/or Digitiser Register Values	B-18
B2.7.1.7 Adjust Contrast, Brightness and/or Colour Saturation	B-18
B2.7.1.8 Select Colour Options for Display	B-18



B2.7.2 For VGA	B-19
B2.7.2.1 Correct Native Image for Blanking	B-19
B2.7.2.2 Correct Native Image for Contrast, Brightness and/or Phase	B-19
B2.7.2.3 Correct Native Image for Position and/or Frequency	B-19
B2.7.3 Create a Screen Lay-out	B-19
B2.7.3.1 Set the Number of Lay-outs in the Lay-out Sequence	B-20
B2.7.3.2 Load an Existing Lay-out	B-20
B2.7.3.3 Modify the Current Screen Lay-out	B-20
B2.7.3.3.1 In General	B-20
B2.7.3.3.2 Move the Picture-in-Picture Location	B-20
B2.7.3.4 Save the Current Screen Lay-out	B-20
B2.7.4 Reboot the System	B-21
B2.7.5 Set the System to Standby	B-21
B2.7.6 Enable/Disable Jagged-edge Compensation	B-21
B2.7.7 Restore Factory-set Defaults to Set-up and Set-up Defaults to User	B-21

LIST OF FIGURES

Figure B-1:	Set-up Menu Structure (high level menus)	B-5
Figure B-2:	<i>Video/Input</i> Menu Structure	B-8
Figure B-3:	<i>Video/Correction</i> Menu Structure	B-9
Figure B-4:	<i>Video/Adjust</i> Menu Structure	B-10
Figure B-5:	<i>VGA/Input</i> Menu Structure	B-12
Figure B-6:	<i>VGA/Adjust</i> Menu Structure	B-12
Figure B-7:	<i>Output/Lay-out</i> Menu Structure	B-14
Figure B-8:	<i>Output/Motion</i> Menu Structure	B-15



B1 INTRODUCTION

The RMU has two menu structures: the User's menu structure and the Set-up menu structure.

The User's menu structure is described in the body of this User's Manual. It allows the operator to perform basic corrections and adjustments effecting the appearance of the display. Any settings made under the User's menu structure will be retained by the unit and will over-ride the settings made under the Set-up menu structure. The operator can, at any time, return all parameters to the settings selected under the Set-up menu structure.

The Set-up menu structure is not used in normal operation. It is only available when a special button combination is activated. It allows basic and advanced set-up of inputs, outputs, corrections and adjustments. The settings selected in the Set-up menu structure become the default settings for parameters in the User's menu structure. Set-up personnel may, at any time, return all parameters under the Set-up menu structure to the factory default settings. The Set-up menu structure is described in the following sections.



B2 OPERATION

CAUTION: observe all precautions described in the User's Manual before attempting to operate the unit.

B2.1 General

B2.1.1 Accessing Set-up Menus

The Set-up menu structure can only be entered by a special button combination on boot-up. This procedure is designed to prevent inadvertent access and changes to the Set-up menu settings.

- Turn the system on and hold button 1 depressed during the system config. screen until the message "Set-up Menus" is displayed.
- The "Set-up Menus" message is only displayed while button 1 is depressed, so the next step must be performed quickly: while the message is being displayed, release button 1 and depress, and keep depressed, button 2.
- The message "Enabled" will be displayed. Release button 2. The appearance of this message confirms that the Set-up menu structure will be made available once the boot sequence is complete, and will be offered in place of the normal User's menu structure.
- If the procedure is not followed correctly, the message "Disabled" will be displayed and the normal User's menu structure will be made available.

CAUTION: once the Set-up menu structure has been enabled, any changes made will be remembered by the unit until either:
a new set of changes is made; or
defaults are restored.

B2.1.2 Menu Structure

The Set-up menu structure is shown in the following diagram.

The higher level menus are described in detail in the following sections. Lower level menus are described within the higher level descriptions.

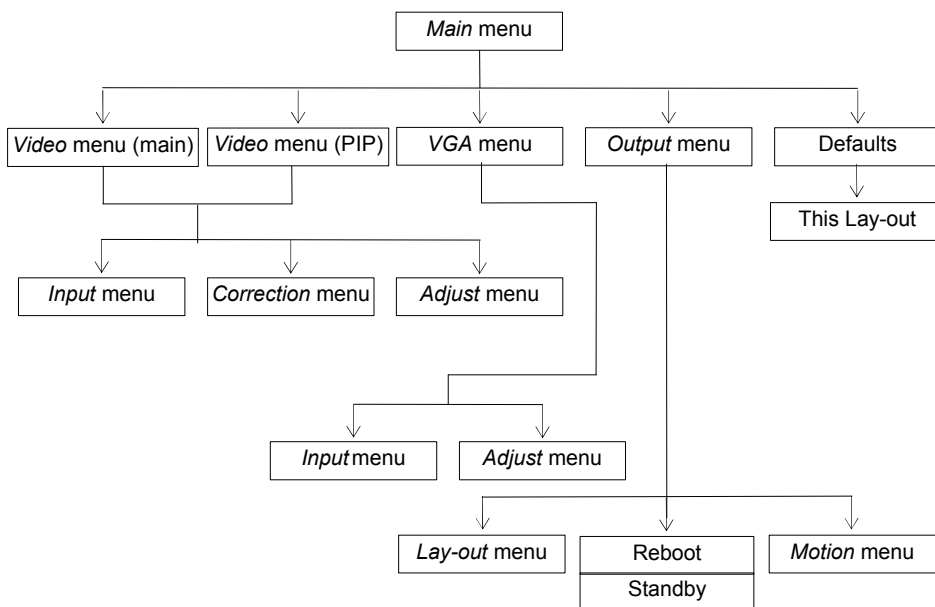


Figure B-1: Set-up Menu Structure (high level menus)

B2.1.3 Recommended Method

The most efficient set-up method is:

- determine how many and what type of inputs will be used;
- decide how many and what screen lay-outs are desired;
- use the *Lay-out* menu to select, modify and save the desired screen lay-outs; then
- use the other set-up operations to optimise the appearance of each input in each screen lay-out.

NOTE: for standard video formats, it is recommended that a lay-out with the appropriate video format be selected to start with, rather than modifying video format via the *Format* menu. (The latter may give rise to unexpected results since the *Format* menu is provided to cater for non-standard formats).



NOTE: the settings made for each input will be retained for that input in the selected (current) screen lay-out. It is not recommended that inputs be optimised prior to defining lay-outs, as the lay-out definition may alter the appearance of the input.

B2.1.4 About Screen Lay-outs

The Black Opal RMU is supplied with pre-configured screen lay-outs. These may be customised, to different extents, under both the User and the Set-up menu structures.

A total of 14 screen lay-outs are stored by the Black Opal RMU, however a maximum of either 5 or 7 (depending on the size of the display unit) are directly available to the user at any one time.

The 14 lay-outs are in two sets of 7, each set at a different level of customisation. One level of customisation is available through the Set-up menu structure and one through the User menu structure.

- 1 to 7 are the lay-outs that may be assigned to the LAYOUT sequence (the LAYOUT sequence can support up to 5 lay-outs from this list for display units 10" or smaller, and up to 7 lay-outs for display units 12" or larger), and customised under the User menu structure. Any customisation performed under the User menu structure is retained by the unit for these lay-outs.
- 8 to 14 are the lay-outs customised under the Set-up menu structure. Any customisation performed under the Set-up menu structure is retained by the unit for these lay-outs. Lay-outs 8 to 14 are the default lay-outs to which lay-outs 1 to 7 are restored when DEFAULTS is used under either the User or the Set-up menu structure.

The unit is supplied with no customisation (unless on special request) and so the settings for 1 to 7 are the same as for 8 to 14.

The screen lay-outs that are assigned to the 14 slots are selected from a list of lay-outs available for the particular model of Black Opal RMU.

Press LAYOUT, or consult the test record accompanying the unit, to see which lay-outs have been assigned for use.



B2.2 Main Menu

- Pressing MENU accesses the *Main* menu which presents the menu items VIDEOMAIN, VIDEOPIP, VGA, OUTPUT and DEFAULTS. Either of the first two will enter the *Video* menu, but selections and adjustments will only apply to the selected camera/video source, i.e. the display settings for each video source may be set independently. Selecting VGA enters the *VGA* menu. Selecting OUTPUT enters the *Output* menu. Selecting DEFAULTS restores all parameters to their factory-set default settings for either the current or for all screen lay-outs.

#	Menu Item	Result
1	Videomain	Accesses <i>Video</i> menu to allow adjustment of display characteristics for the video channel for full screen in the current lay-out.
2	VideoPIP	Accesses <i>Video</i> menu to allow adjustment of display characteristics for the video channel(s) as Picture(s)-in-Picture in current lay-out.
3	VGA	Accesses <i>VGA</i> menu to allow adjustment of display characteristics for VGA channel in current lay-out.
4	Output	Accesses <i>Output</i> menu to create screen lay-outs and to reboot or go to standby.
5	Defaults	Accesses <i>Defaults</i> menu to restore all parameters to the original factory-set default settings for the current or for all screen lay-outs.

- Select the desired item and press ENTER.

B2.3 Video Menu

- Selecting VIDEOMAIN or VIDEOPIP from the *Main* menu accesses the *Video* menu which presents the menu items INPUT, CORRECTION and ADJUST.

#	Menu Item	Result
1	Input	Accesses <i>Input</i> menu to set input parameters, (e.g. connection & signal formats) for the image source.
2	Correction	Accesses <i>Correction</i> menu to adjust parameters such as hue and position.
3	Adjust	Accesses <i>Adjust</i> menu to adjust parameters such as gain, level and colour saturation.

- Select the desired item and press ENTER.



B2.3.1 Input Menu

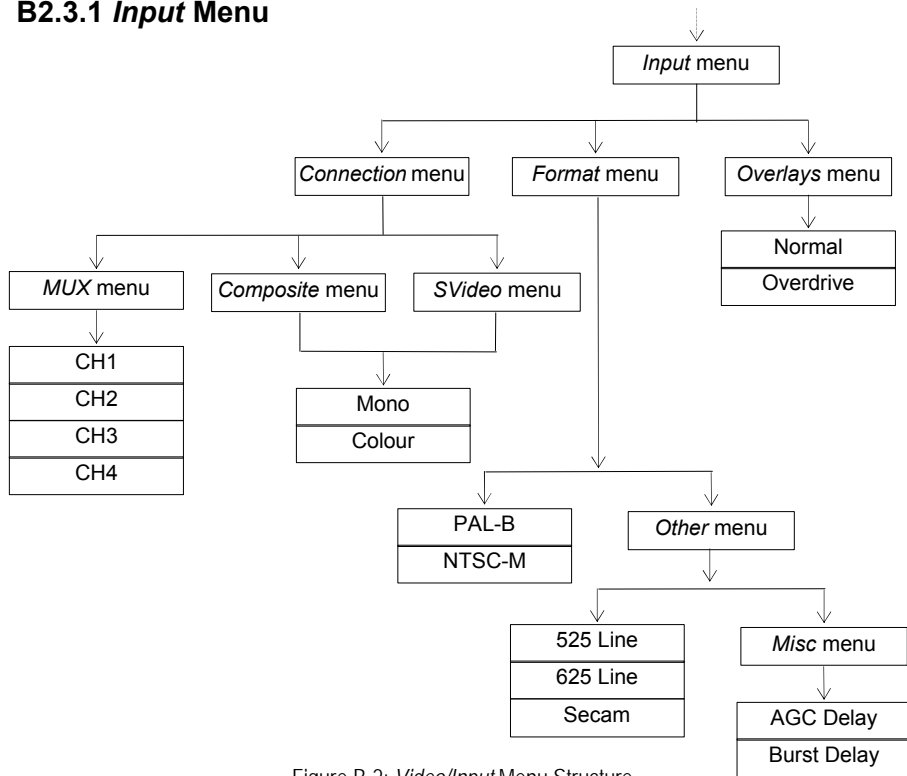


Figure B-2: Video/Input Menu Structure

- Selecting INPUT from the Video menu accesses the Input menu which presents the menu items CONNECTION, FORMAT and OVERLAYS.

#	Menu Item	Result
1	Connection	Allows the setting of connection format (e.g. composite video), and the assignment of a connection to the current lay-out window.
2	Format	Allows the setting of signal format (e.g. PAL).
3	Overlays	Allows selection of Normal or Overdrive ("whiter-than-white").

- Select the desired item and press ENTER.
- Selecting CONNECTION presents the menu items MUX, COMPOSITE and SVIDEO. Selecting MUX presents the menu items CH1, CH2, CH3 and CH4. Select the desired one and press ENTER.



- Selecting either of COMPOSITE or SVIDEO presents the menu items MONO and COLOUR. Select the desired one and press ENTER.
- Selecting FORMAT presents the menu items PAL-B, NTSC-M and OTHER. Select the desired format and press ENTER. Selecting OTHER presents the menu items 525 LINE, 625 LINE, SECAM and MISC. Select the desired one and press ENTER. Selecting MISC presents the menu items AGC DELAY and BURST DELAY. Select the desired one, adjust value and press ENTER.
- Selecting OVERLAYS presents the menu items NORMAL and OVERDRIVE ("whiter-than-white" effect). Select the desired item and press ENTER.

B2.3.2 Correction Menu

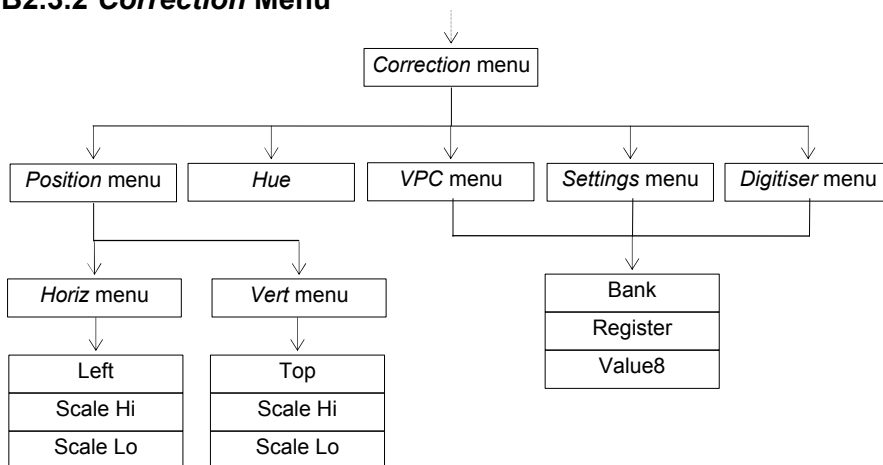


Figure B-3: Video/Correction Menu Structure

- Selecting CORRECTION from the *Video* menu accesses the *Correction* menu which presents the menu items POSITION, HUE, VPC, SETTINGS and DIGITISER.

#	Menu Item	Result
1	Position	Accesses <i>Horiz</i> and <i>Vert</i> menus to allow of image position on the screen (e.g. if native image is not centred).
2	Hue	Allows the adjustment and setting of hue value.
3	VPC	Accesses the <i>VPC</i> menu to allow adjustment of PLD values for the current screen lay-out.
4	Settings	Accesses the <i>Settings</i> menu to allow adjustment of system (non-PLD) values for current screen lay-out.



#	Menu Item	Result
5	<i>Digitiser</i>	Accesses the <i>Digitiser</i> menu to allow adjustment of digitiser values for the current video source.

- Select the desired item and press ENTER.
- Selecting POSITION presents the menu items HORIZ and VERT. Selecting HORIZ presents the menu items LEFT, SCALE HI and SCALE LO. Select the desired item, adjust value and press ENTER. Selecting VERT presents the menu items TOP, SCALE HI and SCALE LO. Select the desired item, adjust value and press ENTER.

NOTE: **some positions on the screen may result in an unstable image. If this occurs, adjust the position slightly until the instability ceases.**

- If HUE is desired, select, adjust value and press ENTER.
- Selecting VPC, SETTINGS or DIGITISER presents the menu items BANK, REGISTER and VALUE8. Select the desired item, adjust value and press ENTER.

CAUTION: **VPC, SETTINGS and DIGITISER should only be used by qualified maintenance engineering personnel.**

B2.3.3 Adjust Menu

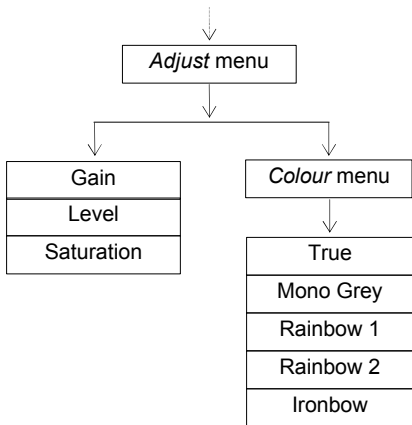


Figure B-4: Video/Adjust Menu Structure



- Selecting **ADJUST** from the *Video* menu accesses the *Adjust* menu which presents the menu items **GAIN**, **LEVEL** and **SATURATION**.

#	Menu Item	Result
1	<i>Gain</i>	Allows the adjustment of gain value for display contrast.
2	<i>Level</i>	Allows the adjustment of offset value for display brightness (as opposed to backlight intensity).
3	<i>Saturation</i>	Allows the adjustment of colour intensity (similar to the "colour" feature on a TV).
4	<i>Colour</i>	Accesses <i>Colour</i> menu to allow selection of colour options (e.g. true colour, mono or inverted).

- Select the desired item and press **ENTER**.
- In the case of **GAIN**, **LEVEL** or **SATURATION**, adjust value and press **ENTER**.
- Selecting **COLOUR** presents the menu items: **TRUE** for true colour, **MONO GREY** for monochrome, **MONO INVERT** for inverted monochrome, **PSEUDO** for preset colourisation, and **PSEUDO INVERT** for inverted preset colourisation. Select the desired item and press **ENTER**.
- Adjust value and press **ENTER**.

B2.4 VGA Menu

NOTE: to set up **VGA** input, go first to the **FREQUENCY** option in the *Position* menu (via the *Adjust* menu, i.e. *Main/VGA/Adjust/Position/FREQUENCY*). Set this value first before any other parameter within the **VGA** menu structure.

- Selecting **VGA** from the *Main* menu accesses the *VGA* menu which presents the menu items **INPUT** and **ADJUST**.

#	Menu Item	Result
1	<i>Input</i>	Accesses <i>Input</i> menu to set blanking input parameters.
2	<i>Adjust</i>	Accesses <i>Adjust</i> menu to adjust parameters such as gain, level, phase and position.
3	<i>Update</i>	Store current PC mode adjustments into EEPROM.

- Select the desired item and press **ENTER**.



B2.4.1 *Input* Menu

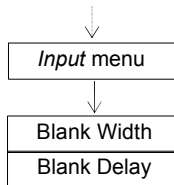


Figure B-5: *VGA/Input* Menu Structure

- Selecting INPUT from the *VGA* menu accesses the *Input* menu which presents the menu items BLANK WIDTH and BLANK DELAY.

#	Menu Item	Result
1	Blank Width	Allows adjustment of the blanking width.
2	Blank Delay	Allows adjustment of the blanking delay.

- Select the desired item, adjust value, and press ENTER.

B2.4.2 *Adjust* Menu

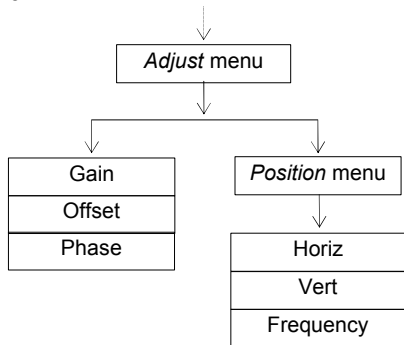


Figure B-6: *VGA/Adjust* Menu Structure

- Selecting ADJUST from the *VGA* menu accesses the *Adjust* menu which presents the menu items GAIN, OFFSET, PHASE and POSITION.

#	Menu Item	Result
1	Gain	Allows the adjustment of gain value for display contrast.
2	Offset	Allows the adjustment of offset value for display brightness (as opposed to backlight intensity).
3	Phase	Allows the adjustment and setting of phase value.



#	Menu Item	Result
4	<i>Position</i>	Accesses <i>Position</i> menu allow correction of horizontal and vertical position, and adjustment of frequency value.

- Select the desired item and press ENTER.
- If GAIN, OFFSET or PHASE are desired, select, adjust value and press ENTER.
- Selecting POSITION presents the menu items HORIZ, VERT and FREQUENCY. Select the desired item, adjust value and press ENTER.

NOTE: ensure that **FREQUENCY** is set before any other parameter in the **VGA** menu structure;

some positions on the screen may result in an unstable image - if this occurs, adjust the position slightly until the instability ceases.

B2.5 *Output* Menu

- Selecting OUTPUT from the *Main* menu accesses the *Output* menu which presents the menu items LAYOUT, REBOOT, STANDBY and MOTION.

#	Menu Item	Result
1	<i>Lay-out</i>	Accesses the <i>Lay-out</i> menu for creation of screen lay-outs (such as picture-in-picture) and defines the lay-out sequence for the LAYOUT (button 2) function.
2	<i>Reboot</i>	Reboots the system.
3	<i>Standby</i>	Sets the system to standby.
4	<i>Motion</i>	Accesses the <i>Motion</i> menu to enable or disable jagged-edge compensation.

- Select the desired item and press ENTER.
- Selecting LAYOUT accesses the *Lay-out* menu.
- Selecting REBOOT is the same as turning the unit off then on. It is used during software maintenance activities.
- Selecting STANDBY is the same as turning the unit off. It is used during software maintenance activities.
- Selecting MOTION accesses the *Motion* menu.



B2.5.1 Lay-out Menu

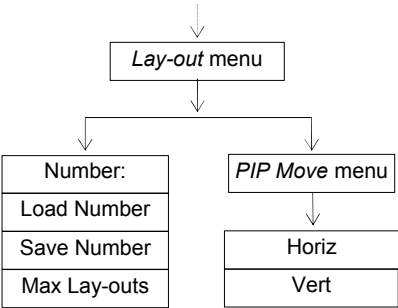


Figure B-7: Output/Lay-out Menu Structure

- Selecting LAYOUT from the *Output* menu accesses the *Lay-out* menu which presents the menu items NUMBER:, LOAD NUMBER, SAVE NUMBER, MAX LAYOUTS and PIP MOVE.

#	Menu Item	Result
1	Number:	Allows nomination of either the source (load) or the destination (save) number of a screen lay-out.
2	Load Number	Loads the nominated pre-stored screen lay-out (1 to 14 available).
3	Save Number	Saves the current screen lay-out to the nominated number (and thus the slot of that lay-out in the LAYOUT sequence) (1 to 14 available).
4	Max Lay-outs	Sets the total number of screen lay-outs to be used in the LAYOUT sequence (max. limit of 5 for display units with a vertical array of buttons behind a rubber membrane, 7 for display units with a horizontal array of individual buttons) if this lay-out is to be part of the LAYOUT sequence).
5	PIP Move	Accesses the <i>PIP Move</i> menu to allow positioning of the Picture-in-Picture (available some lay-outs only).

- Select the desired item, adjust value (if applicable), and press ENTER.

CAUTION: to avoid over-writing wanted lay-outs, **ALWAYS** select a lay-out number, with care, before loading or saving.

NOTE: some positions on the screen may result in an unstable image - if this occurs, adjust the position slightly until the instability ceases.



B2.5.2 Motion Menu

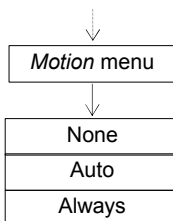


Figure B-8: *Output/Motion* Menu Structure

- Selecting MOTION from the *Output* menu accesses the *Motion* menu which presents the menu items NONE, AUTO and ALWAYS.

#	Menu Item	Result
1	<i>None</i>	No jagged-edge compensation: normal, de-interlaced display, resulting in high vertical resolution and no flicker, but with the jagged-edge artifacts typical of LCDs when displaying moving images.
2	<i>Auto</i>	Turns jagged-edge compensation on and off, when motion or lack of motion is detected. Motion is determined by comparing consecutive fields in one frame, and by comparing consecutive frames.
3	<i>Always</i>	Jagged-edge compensation: non-interlaced display, removing the jagged-edge artifacts typical of LCDs when displaying moving images, but with reduced vertical resolution and some flicker. This mode emulates the performance of a CRT display.

- Select the desired item and press ENTER.

NOTE: Jagged Edge Compensation is available whenever the main window in a Screen Lay-out is video, not PC input.

B2.6 Defaults Menu

- Selecting DEFAULTS from the *Main* menu accesses the *Defaults* menu which presents the menu items THIS LAYOUT and ALL LAYOUTS.

#	Menu Item	Result
1	<i>This Lay-out</i>	Restores Set-up values to the User parameters, and factory-set values to the Set-up parameters for the current screen lay-out.

- Select the desired item and press ENTER.



B2.7 Working with Menus - How to

In every case:

selection of a menu item is achieved by scrolling to it with the scroll/adjust (-/+) buttons and then pressing ENTER (button 5); and

setting a value is achieved by adjusting it to the desired value using the scroll/adjust (-/+) buttons and then pressing ENTER (button 5);

Once a selection has been made or a value has been set:

if no other items in the current menu are still relevant, the system will return to the next highest relevant menu; or

if other items in the current menu are still relevant, the system will remain in the current menu.

You can progress back up the menu structure by selecting BACK, or close the menu presentation entirely by pressing EXIT (button 2).

NOTE: pressing EXIT will abandon any in-progress adjustments (i.e. adjustments that have not yet been set by pressing ENTER).

B2.7.1 For Video

- From the *Main* menu, select VIDEOMAIN or VIDEOPIP.

B2.7.1.1 Set Composite or SVideo Connection Format

- From the *Video* menu, select INPUT.
- From the *Input* menu, select CONNECTION.
- Select COMPOSITE or SVIDEO to suit the incoming signal.
- Select MONO or COLOUR to suit the incoming signal.

B2.7.1.2 Set PAL-B or NTSC-M Signal Format

- From the *Video* menu, select INPUT.
- From the *Input* menu, select FORMAT.
- From the *Format* menu, select PAL-B or NTSC-M to suit the incoming signal.



B2.7.1.3 Set Other Signal Formats

- From the *Video* menu, select INPUT.
- From the *Input* menu, select FORMAT.
- From the *Format* menu, select OTHER.
- From the *Other* menu, select 525 LINE or 625 LINE or SECAM to suit the incoming signal.
- If adjustments must be made for non-standard signal formats, select MISC and set AGC DELAY and BURST DELAY values to suit the incoming signal.

B2.7.1.4 Set Normal or “Whiter-Than-White” Overlay

- From the *Video* menu, select INPUT.
- From the *Input* menu, select OVERLAYS.
- From the *Overlays* menu, select NORMAL (only required if system has previously been set to OVERDRIVE and you wish to return to normal overlay), or select OVERDRIVE for “whiter-than-white” effect.

B2.7.1.5 Correct Native Image for Position and/or Hue

- From the *Video* menu, select CORRECTION.
- From the *Correction* menu, select POSITION or HUE, as required.
- For HUE, set value as required.
- For POSITION, from the *Position* menu select HORIZ or VERT as required. Select position parameter(s) and set value(s) as required.



B2.7.1.6 Alter PLD, System and/or Digitiser Register Values

CAUTION: VPC, SETTINGS and DIGITISER should only be used by qualified maintenance engineering personnel. Customised work instructions must be developed in advance in consultation with Lasergyne.

- From the *Video* menu, select CORRECTION.
- From the *Correction* menu, select VPC (to alter PLD settings), SETTINGS (to alter system settings) or DIGITISER (to alter digitiser settings).
- Select BANK, REGISTER or VALUE8 as required, and set the required value(s).

B2.7.1.7 Adjust Contrast, Brightness and/or Colour Saturation

- From the *Video* menu, select ADJUST.
- From the *Adjust* menu, select GAIN (to adjust display contrast), LEVEL (to adjust display brightness, as opposed to backlight intensity), or SATURATION (to adjust colour intensity), as required.
- Set value(s) as required.

B2.7.1.8 Select Colour Options for Display

- From the *Adjust* menu, select COLOUR.
- From the *Colour* menu, select TRUE (to display the true input colour) or MONO GREY [to display 8-bit grey scale]; or
- From the *Colour* menu, select RAINBOW 1 for pseudo colourisation based on spectral rainbow version 1, RAINBOW 2 for pseudo colourisation based on spectral rainbow version 2, or IRONBOW for pseudo colourisation based on the colour temperature spectrum of iron. The *Pseudo* menu will be offered.
- If a pseudo colourisation item has been selected from the *Colour* menu (RAINBOW 1, RAINBOW 2 or IRONBOW) then from the *Pseudo* menu, select TRUE for unmodified pseudo colourisation, INVERT for inverted pseudo colourisation, THRESHOLD to enable a "temperature" (grey scale) threshold above which pseudo colourisation is applied, or ADJUST for setting the threshold to be enabled by THRESHOLD. Select the desired item and press ENTER.



B2.7.2 For VGA

NOTE: ensure that **FREQUENCY** is set before any other parameter in the **VGA** menu structure.

- From the *Main* menu, select **VGA**.

B2.7.2.1 Correct Native Image for Blanking

- From the **VGA** menu, select **INPUT**.
- From the *Input* menu, select **BLANK WIDTH** or **BLANK DELAY** as required.
- Set value(s) as required.

B2.7.2.2 Correct Native Image for Contrast, Brightness and/or Phase

- From the **VGA** menu, select **ADJUST**.
- From the *Adjust* menu, select **GAIN** (to adjust display contrast), **OFFSET** (to adjust display brightness, as opposed to backlight intensity) or **PHASE**, as required.
- Set value(s) as required.

B2.7.2.3 Correct Native Image for Position and/or Frequency

- From the **VGA** menu, select **ADJUST**.
- From the *Adjust* menu, select **POSITION**.
- Select **HORIZ**, **VERT** or **FREQUENCY** as required.
- For **POSITION**, from the *Position* menu select **HORIZ** or **VERT** as required. Select position parameter(s) and set value(s) as required.
- For **FREQUENCY**, set value as required.

B2.7.3 Create a Screen Lay-out

- From the *Main* menu, select **OUTPUT**.
- From the *Output* menu, select **LAYOUT**.



B2.7.3.1 Set the Number of Lay-outs in the Lay-out Sequence

- From the *Lay-out* menu, select MAX LAYOUTS.
- Set value as required.

B2.7.3.2 Load an Existing Lay-out

- From the *Lay-out* menu, select NUMBER:.
- Set value as required (1 to 14 available).
- From the *Lay-out* menu, select LOAD NUMBER.

B2.7.3.3 Modify the Current Screen Lay-out

B2.7.3.3.1 In General

Once an existing lay-out has been loaded, it may be used as a template and customised using the operations available under the Set-up menu structure.

The customisation that may be performed consists of setting the available display parameters to suit the incoming signal, environment and personal preferences, and of moving Picture-in-Picture to desired locations on the screen.

B2.7.3.3.2 Move the Picture-in-Picture Location

- From the *Lay-out* menu, select PIP MOVE.
- From the *PIP Move* menu, select HORIZ or VERT as required.
- Set value(s) as required.

B2.7.3.4 Save the Current Screen Lay-out

- From the *Lay-out* menu, select NUMBER:.
- Set value as required [1 to 14 available - use 1 to 5 (for display units with a vertical array of buttons behind a rubber membrane), or 1 to 7 (for display units with a horizontal array of individual buttons) if this lay-out is to be part of the LAYOUT sequence].
- From the *Lay-out* menu, select SAVE NUMBER.
- Set value as required.



B2.7.4 Reboot the System

NOTE: this function is the same as turning the system off and then on again using the On/Off button. It is used during software maintenance activities.

- From the *Main* menu, select OUTPUT.
- From the *Output* menu, select REBOOT.

B2.7.5 Set the System to Standby

NOTE: this function is the same as turning the system off using the On/Off button. It is used during software maintenance activities.

- From the *Main* menu, select OUTPUT.
- From the *Output* menu, select STANDBY.

B2.7.6 Enable/Disable Jagged-edge Compensation

- From the *Main* menu, select OUTPUT.
- From the *Output* menu, select MOTION.
- From the *Motion* menu, select NONE (for no compensation), AUTO (for compensation only when the system detects motion in the image) or ALWAYS (for compensation), as required.

B2.7.7 Restore Factory-set Defaults to Set-up and Set-up Defaults to User

- From the *Main* menu, select DEFAULTS.
- From the Defaults menu, select THIS LAYOUT as required.



APPENDIX C: COMMS SUPPORT

The Black Opal RMU's basic user controls may be controlled via external comms., except that the unit must be turned on manually.

The data format is RS232: 9600, n, 8, 1. (See Connector/Pin Details for wiring.)

Each command is a single character. Upon receipt of the command, the Black Opal RMU responds with "&" + char + ↵.

All commands are in upper case. The commands and their results are shown on the following table.

Char	Result	Response	Note
1	press function button 1	&1↵	
2	press function button 2	&2↵	
3	press function button 3	&3↵	
4	press function button 4	&4↵	
5	press function button 5	&5↵	
+	press scroll/adjust up/right ("+") button	&+↵	
-	press scroll/adjust down/left ("-") button	&-↵	
A	select lay-out no. 1	&A↵	
B	select lay-out no. 2	&B↵	
C	select lay-out no. 3	&C↵	
D	select lay-out no. 4	&D↵	
E	select lay-out no. 5	&E↵	
F	select lay-out no. 6	&F↵	in the case of models with a horizontal array of individual buttons
G	select lay-out no. 7	&G↵	



Char	Result	Response	Note
K	enable remote button mode ³	&K↓	all button presses will cause response codes only (no RMU GUI operation)
P	press power button (OFF only)	&P↓	
X	disable remote button mode ³	&X↓	restores normal local button operation (same as pressing – and + buttons simultaneously)

³ Remote button mode allows the user to use the RMU's buttons as inputs to another host (e.g. a PC). In this mode, the RMU buttons do not function as part of the RMU GUI, but instead send out via the RS232 comms connection as &n↓, where n is the character corresponding to the button as shown in the table. To return to normal operation, either send X to the RMU, or press the RMU – and + buttons simultaneously (causing &X↓ to be output).



A Division of Lasergyne Pty Ltd
A.C.N. 053 743 132

P.O. Box 6541	17 Production Ave
GCMC Bundall	Ernest
Queensland 9726	Queensland 4214
Australia	Australia

Tel: (07) 5594 9772	Int'l Tel: 61 7 5594 9772
Fax: (07) 5594 9981	Int'l Fax: 61 7 5594 9981

email: laserdyne@laserdyne.com.au
website: www.laserdyne.com.au

T:\PROD&PRO\MANUALS\UM-RMU-C-0288-0_2 TW/TW

The information contained herein is proprietary to Lasergyne Pty Ltd. No part of this work may be reproduced or copied in any way without prior written permission of Lasergyne Pty Ltd.

Note: specifications herein are subject to change without notice.